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Immediate Water Pollution Control Needs, Lower Arkansas River Basin, Arkansas

Federal Water Pollution Control Administration, Dallas, Tex

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IMMEDIATE WATER POLLUTION CONTROL NEEDS

LOWER ARKANSAS RIVER BASIN

ARKANSAS

U. S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTH CENTRAL REGION
DALLAS, TEXAS 75202

APRIL 1967

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The purpose of the report is to focus attention on known sources of pollution in this area and to provide a priority for action to correct existing problems and to prevent future problems.

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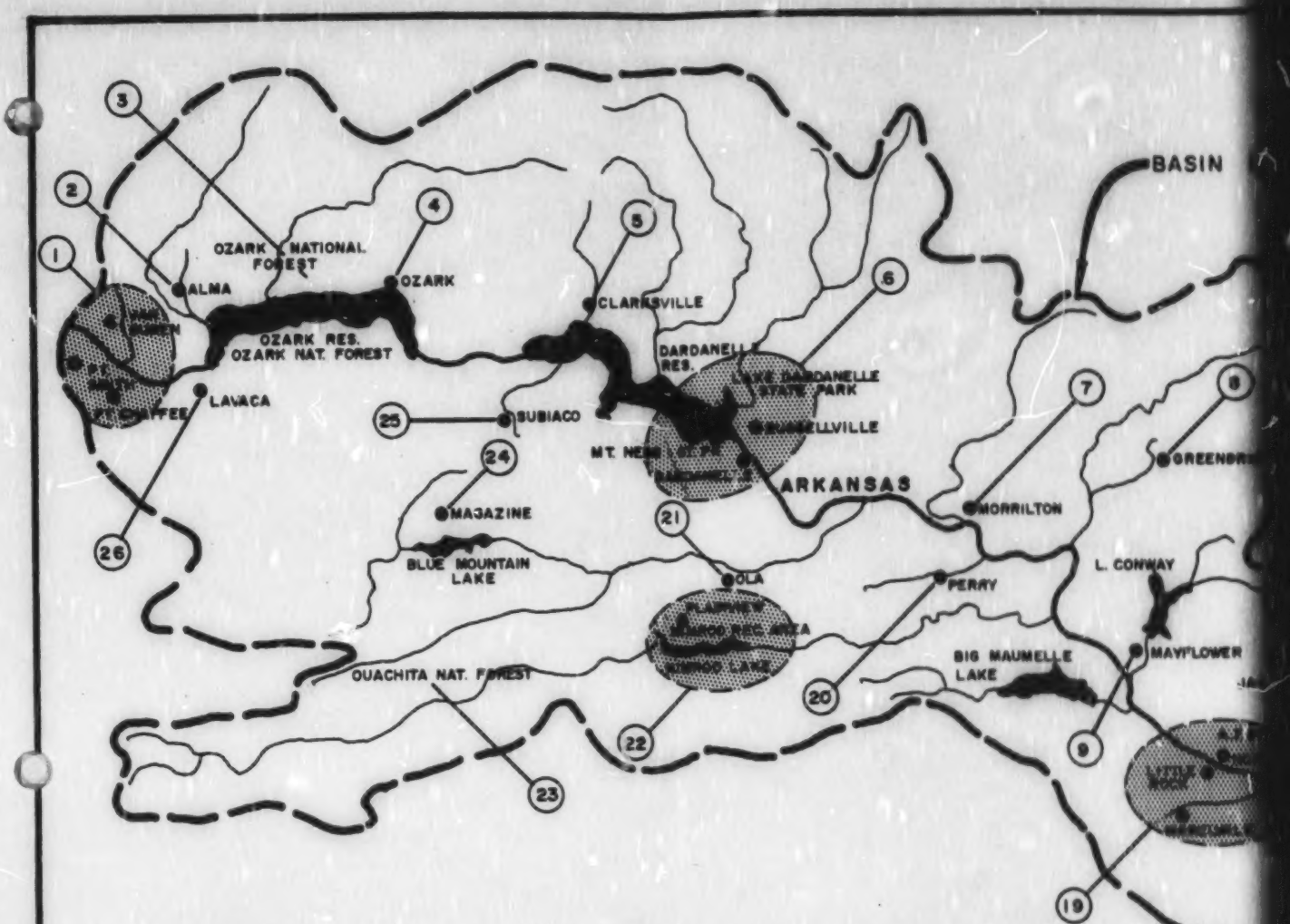
I. Introduction

The purpose of this report is to focus attention on known sources of pollution and to provide a priority for action to correct the existing water pollution problems and prevent future problems in the Lower Arkansas River, (see Figure 1), an interstate stream and its tributaries. This report is based on compilations of available data of the Federal Water Pollution Control Administration, South Central Region, and the pollution control agency of Arkansas. No detailed water quality surveys or engineering studies were carried out for the preparation of this report.

The findings of this report are based on the best information available at this time on water quality conditions and immediate and potential pollution abatement needs. The omission of any particular town, industry, or other establishment from this report does not imply that an immediate or potential pollution abatement need may not possibly exist in that particular area. Priorities listed are based solely on an evaluation of the Lower Arkansas River and not on a relative basis with other basins in the South Central Region.

Authority is given in Section 3(a) of the Federal Water Pollution Control Act, as amended, for the preparation or development of comprehensive programs for eliminating or reducing the pollution of interstate waters and tributaries thereof and improving the sanitary conditions of surface and underground waters. This report, by describing the immediate needs for controlling water pollution in the Lower Arkansas River, represents another step in the development of a comprehensive program to control water pollution of this river.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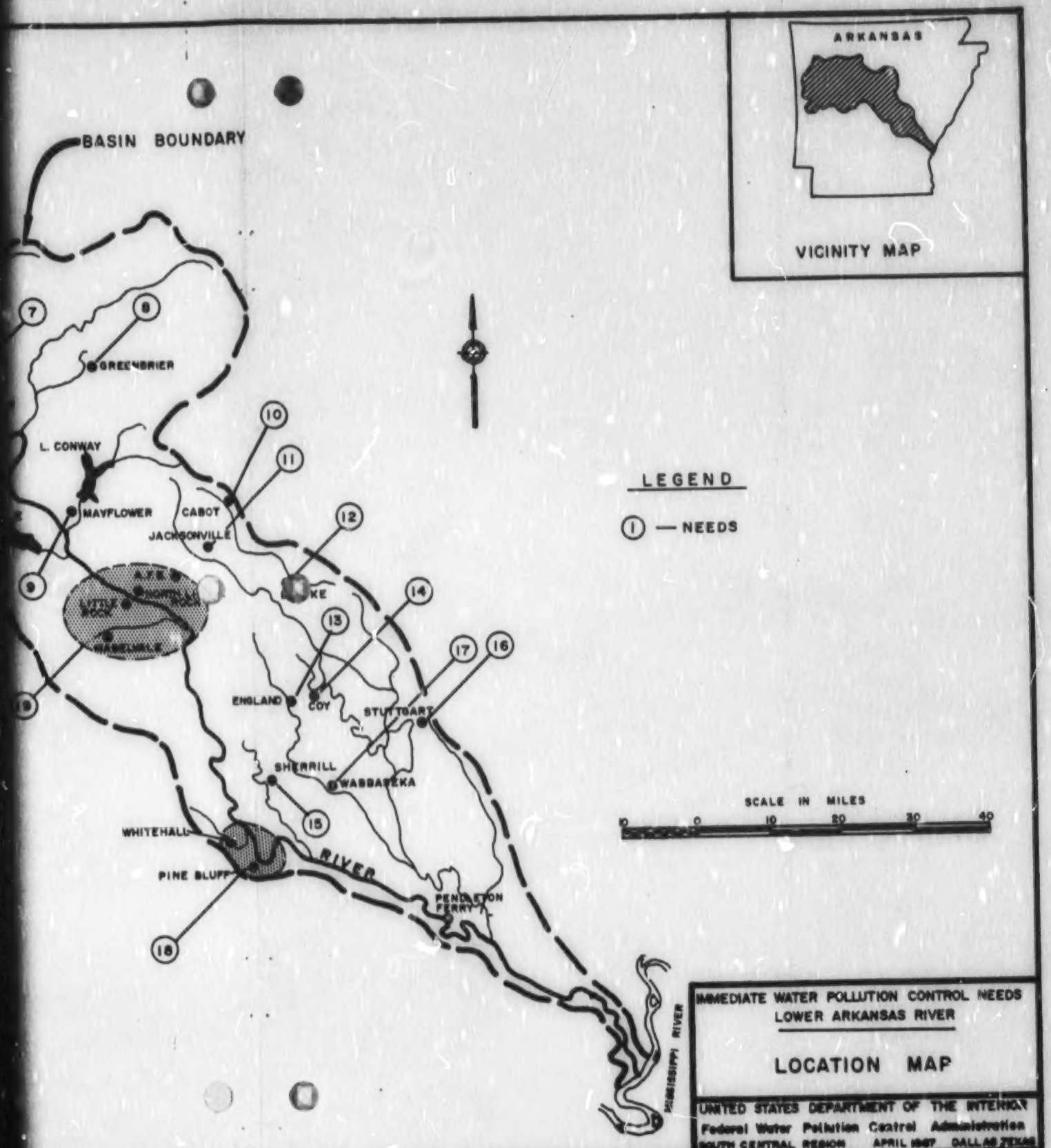

IMMEDIATE WATER POLLUTION CONTROL NEEDS
LOWER ARKANSAS RIVER

LOCATION MAP

UNITED STATES DEPARTMENT OF THE INTERIOR
Federal Water Pollution Control Administration
SOUTH CENTRAL REGION APRIL 1967 DALLAS TEXAS

FIGURE 1

II. Summary of Immediate Pollution Control Needs

Pollution problems in the Lower Arkansas River basin, as indicated by septic conditions, high mineral concentrations, oxygen depletion, and degradation of aesthetics, include damages to propagation of fish life, deterioration of municipal and industrial water supplies, and impairment of water quality for recreation uses. Top priority should be given to carrying out the recommendations of the Arkansas-Red River Water Quality Conservation Project to control the natural and manmade sources of salt (mineral) pollution located in the Arkansas River basin above the Arkansas-Oklahoma State line. (Details on these sources of pollution will be found in the Immediate Needs Report - Middle Arkansas River Basin).

The immediate pollution control needs are listed in the following tabulation and grouped into categories: waste treatment, other pollution control practices, institutional practices and research. Location designations refer to Figure 1.

Waste Treatment

Location	Responsibility	Need	Priority
1	City of Fort Smith, Arkansas	Secondary treatment plant;	A
	City of Van Buren, Arkansas	Secondary treatment	A
	Fort Chaffee, U.S. Army, near Fort Smith, Arkansas	Primary & secondary treatment	A
2	Town of Alma, Arkansas	Primary & secondary treatment	B
3	U.S. Forest Service, Ozark National Forest	Secondary--septic tanks & pit toilets at 6 recreation areas	B
4	City of Ozark, Arkansas	Secondary treatment	B
5	City of Clarksville, Arkansas	Expansion of secondary treatment	B
6	State of Arkansas Lake Dardenelle State Park	Primary & secondary treatment	B
	Mt. Nebo State Park	Primary & secondary treatment	B

Waste Treatment (Continued)

Location	Responsibility	Need	Priority
	Cities of: Russellville, Arkansas	Expansion of facilities	B
	Dardanelle, Arkansas	Secondary treatment	B
7	City of Morrilton, Arkansas	Secondary treatment	B
8	Town of Greenbrier, Arkansas	Primary & secondary treatment	B
9	Town of Mayflower, Arkansas	Primary & secondary treatment	B
10	City of Cabot, Arkansas	Secondary treatment	B
11	City of Jacksonville, Arkansas	Expansion of facilities & chlorination	A
12	City of Lonoke, Arkansas	Secondary treatment	B
13	City of England, Arkansas	New secondary facilities	B
14	Town of Coy, Arkansas	Primary & secondary treatment	B
15	Town of Sherrill, Arkansas	Primary & secondary treatment	B
16	City of Stuttgart, Arkansas	Secondary treatment	B
17	Town of Wabbaseka, Arkansas	Primary & secondary treatment	B

Waste Treatment (Continued)

Location	Responsibility	Need	Priority
18	City of Pine Bluff, Arkansas	Expansion of facilities	A
	Pine Bluff Arsenal-at Pine Bluff,Ark.	Replacement of primary treatment plant	B
	Town of Whitehall, Arkansas	Primary & secondary treatment	B
19	City of Little Rock, Arkansas	Secondary treatment	A
	Little Rock AFB at Little Rock,Ark.	Sewer line improvements	B
	City of North Little Rock, Arkansas.	Interconnect sewer & secondary treatment	A
	Town of Mabelvale, Arkansas	Primary & secondary treatment	B
20	Town of Perry, Arkansas	Primary & secondary treatment	B
21	City of Ola, Arkansas	Expand primary - add secondary treatment	B
22	City of Plainview, Arkansas	Primary & secondary treatment	B
	State of Arkansas Nimrod Dam & Res.-Rec. Areas	Secondary treatment	B
23	U.S.Forest Service Ouachita National Forest	Secondary-septic tank & pit toilets at 4 rec. areas	B
24	Town of Magazine, Arkansas	Primary & secondary treatment	B
25	Town of Subiaco, Arkansas	Primary & secondary treatment	B
26	City of Lavaca Arkansas	Primary & secondary treatment	B

Other Pollution Control Practices

Location	Responsibility	Need	Priority
Middle Arkansas Basin	Federal Agencies & State of Okla.	The Arkansas-Red River Water Quality Conservation Project recommendations for control of sources of mineral pollution in the Arkansas River Basin above the Arkansas-Oklahoma state line should be carried out as rapidly as possible to reduce the high mineral content of the water to an acceptable level for municipal and industrial use.	A
Institutional Practices			
Basinwide	FWPCA and State of Arkansas.	Should, in cooperation with other interested organizations, establish and promote an effective comprehensive water pollution control and water quality management program in the basin.	B
Basinwide	State of Arkansas	Should establish water quality standards for interstate and intrastate streams in the Lower Arkansas River Basin.	B
Basinwide	State of Arkansas	Should consider the need for expansion of the water quality monitoring network and surveillance program (including treatment plant operation).	A
Basinwide	State of Arkansas	Should consider legislation to provide appropriations for State participation in grants for construction of sewage treatment works.	B
Research			
Main Stem of Ark. River.	FWPCA	Should conduct a study to determine the effect of the dam and reservoir construction program along the Arkansas River on water quality, flow, and stream and lake ecology.	B

Research (Continued)

Location	Responsibility	Need	Priority
Basinwide	Pesticide producers and United States Dept. of Agric.	Should develop pesticides and herbicides which are toxic to specific organism but have little or no effect on aquatic life. The use of these agricultural materials, following their development, should be promoted by U.S. Dept. of Agriculture and FWPCA.	B

III. Immediate Control Needs

Various measures are needed to control existing and potential pollution of the Lower Arkansas River and its tributaries. These measures are needed to abate septic conditions, increase oxygen content, reduce mineral content, reduce concentrations of toxic materials, and control streamflows in order to improve and preserve water quality for municipal and industrial water supply, propagation of fish and wildlife, and recreation.

The actions recommended here though not all encompassing are, however, prerequisite to good water quality planning and should be included in local, State, and Federal programming for water pollution control. Background for these immediate needs are summarized in Chapter VI.

Waste Treatment

A new waste treatment plant and sewer system is needed for the city of Fort Smith, Arkansas to serve a design population of 120,000. (These facilities are not under construction.)

The city of Jacksonville needs enlarged waste treatment facilities and chlorination treatment of municipal waste. There is an immediate need to expand the present facility designed for 10,000 population to a design of 16,000 population.

The primary treatment plant must be enlarged and secondary treatment added to serve a design population of 200,000 population for the city of Little Rock, Arkansas. This is the largest single source of municipal waste in the basin and top priority should be given for corrective measures.

The city of North Little Rock, across the river from the city of Little Rock, is also in dire need of secondary facilities to treat their municipal and industrial waste. The design need is for 80,000 population for secondary treatment plant. The need for an improved sewer system is being met by the present project under construction.

Enlarged waste treatment facilities for the city of Pine Bluff, Arkansas are needed immediately to serve a design population of 70,000. A project for secondary treatment is presently under construction to meet this need.

Van Buren has an immediate need for secondary treatment for a design population of 7,000. The present primary treatment plant of 4,500 must be expanded and secondary treatment added.

Fort Chaffee has a need for a new waste treatment facility for a design population of 7,000. There are no present facilities and

this new secondary treatment facility is a must to protect the health of military population, much of which is transient, and the downstream population.

New or expanded treatment facilities are needed by at least 24 other communities, two military installations, two national forests, two State parks, and one recreation area (as outlined in the summary table). The list of needs is not considered all inclusive and does not reflect projected needs due to future obsolescense or to expanded or changed water uses.

Other Pollution Control Practices

The most immediate need in the Arkansas River basin is to improve the quality of the water upstream from the Arkansas State line. The present high mineral content of the water prohibits its use as a source of water supply for municipalities, industries, and agriculture. The high mineral content results principally from both natural brine emissions and oil production in the Middle Arkansas River basin.

Institutional Practices

An effective comprehensive water pollution control and water quality management program is needed in the basin. Federal Water Pollution Control Administration should act as coordinator between State and Federal agencies for all plans of construction of impoundments, highways, levees, dams, flood control, and soil conservation work which may affect water quality, flow regulation, stream ecology, or pose a water pollution problem.

State water quality standards should be established and the public educated as to their meanings as soon as possible. The State of Arkansas has circulated their proposed standards to the general public and held the first statewide hearings.

The present excellent water quality and surveillance program conducted by the State of Arkansas should be expanded. Education of treatment plant operators in the latest operational procedures of waste treatment is desirable. Increased surveillance and operation inspection of sewage and industrial waste treatment plants are needed to locate and identify existing and potential serious pollution problems.

State participation in the waste treatment plant construction grants program is needed to accelerate the construction of needed improvements.

Research

Federal Water Pollution Control Administration should conduct a study using accepted environmental simulation techniques to determine how the dams and reservoirs proposed and under construction in Oklahoma and Arkansas affect the stream and lake ecology, water quality, and flow of the Arkansas kiver.

Federal Water Pollution Control Administration should provide specialized personnel and laboratories for technical, engineering, and biological studies. A special need exists for a comprehensive field investigation coordinated with research in Federal Water Pollution Control Administration laboratories to keep abreast of growth and advances in the agrichemical and petrochemical industries

IV. Costs

The estimated cost of pollution control measures listed in the summary table is shown in the following tabulation:

Item	Estimated Cost
Municipal Waste Treatment Facilities:	
New treatment facilities primary and secondary treatment	$ 1,917,000
Expansion of treatment facilities	26,538,000
State Recreation Area:	
New treatment facilities	5,000
National Forest Recreation Areas:	
Addition of new treatment facilities	424,000
Other:	
Reduction of high mineral content in the Arkansas River above Ft. Smith	*
TOTAL	$28,884,000

*Costs are covered in Immediate Needs - Middle Arkansas River Basin

V. Recent Progress in Pollution Control

Federal Aid Construction Grants Program

Through a continuing construction grants program, many treatment facilities have been completed since 1958. Under this program, five projects are presently under construction, and six grants have been awarded.

State Agencies

The Arkansas Pollution Control Commission, in cooperation with other State departments and municipalities, has made significant strides in recent years in controlling water pollution through surveillance, construction of treatment facilities, training programs, stream monitoring networks, and periodic inspection of treatment plant operation.

Arkansas-Red River Water Quality Conservation Project

The Arkansas-Red River Water Quality Conservation Project conducted an intensive study beginning in 1961 on the water quality of the Arkansas and Red Rivers. This study revealed that the Arkansas River water quality deterioration was due to minerals contributed from natural salt emissions in the Middle Arkansas River basin. The quality was further degraded by man-produced oilfield brines. A program was implemented by the State of Oklahoma and Federal agencies to reduce the minerals entering the middle Arkansas River. (See the Middle Arkansas River Immediate Needs Report for recent progress.)

The Lower Mississippi River Project

The Federal Water Pollution Control Administration has phased out its intensive Lower Mississippi River Technical Assistance Program activities relative to the pesticide endrin and is presently moving to more broad based activities representing water resource planning for the entire Lower Mississippi River basin which includes the Lower Arkansas River basin.

VI. Background

Description and Topography of the Area

The Arkansas River basin is located in the Central Plain region in a portion of the Ozark-Ouachita uplift, coastal plain, and alluvial plain region.

The Arkansas River rises in the southern Rocky Mountains of Colorado and New Mexico at elevations upwards of 10,000 feet; drops rapidly to the nearly unbroken surfaces of the high plains at an elevation of about 5,000 feet; and then continues southeasterly at more gradual slopes through the high plains, the Ozark-Ouachita uplift, and the Coastal Plain to its confluence with the Mississippi River at an elevation of less than 200 feet.

The general appearance below Fort Smith in the Ozark-Ouachita uplift area is hilly with fairly swift and clear tributaries, only to become sluggish and meandering upon reaching the Coastal Plain below Little Rock.

The soil groups of the State are important to consider because they reflect the changes in topography and variation in vegetation which can be supported and which cause the differences in recreation potential. The Ozark Highlands are comprised chiefly of limestone hills and valleys that afford considerable natural scenic beauty plus lakes, rivers, and sites of historic interest. The Arkansas Valley area is sandstone and shale comprising broad valleys, narrow ridges, and high flat-topped mountains in the central portion of Arkansas. The valley widens into the forested Coastal Plain comprised of rolling sandy land and broad "flatwoods", chiefly in Southern Arkansas.

The climate is moderate, and the Lower Arkansas River basin has a mean average precipitation of 50 inches. The summers are moderately long and hot with short and moderate winters. The growing season and topography provide the State with ideal conditions for year-round recreation and outdoor activities. In 1962 over 16,400,000 visitors to Arkansas enjoyed sightseeing, hunting, fishing, and camping at an estimated $465,000,000 benefit to Arkansas. The tourist industry is forecast to double from 1960 to 1970 in the State.

The chloride content of the Arkansas River at Fort Smith, the upper perimeter of the area covered in this report, varied from a mean of 294 to a high of 1,200 milligrams per liter (mg/l) for the period of 1959 through 1965. The U.S. Public Health Service Drinking Water Standards allows a maximum of 250 mg/l. The dissolved solids varied from a mean of 896 mg/l to a high of 2,340 mg/l during this period. The U.S. Public Health Service Drinking Water Standards allows a maximum of 500 mg/l. Below Fort Smith, tributaries of high

quality water empty into the Arkansas River, diluting the concentration of chlorides and solids. However, the improvement is not sufficient to allow use of the water. Most of the population and industries in the basin are located between Fort Smith and Little Rock. The municipalities and other water users take their water from wells and local surface water sources. However, with the full utilization of the local surface water sources, the water users will soon be forced to turn to the Arkansas River.

Recreation activities are confined mostly in the hill country west of Little Rock to Fort Smith. The two largest towns in the basin are Little Rock (population 107,813), and Fort Smith (population 52,991). The center of population is centered along the Arkansas River near Little Rock. The lower reaches of the river is primary farming land and forest area.

Present Water Quality Problems

As a result of brine emissions and releases in the middle Arkansas River basin, water quality is seriously degraded so as to be unsuitable for general municipal, industrial, and agricultural use in the main stem of the Arkansas River from Fort Smith to its mouth. During 2 years (1961-62) of an intensive study by the Public Health Service's Arkansas-Red River Basin Water Quality Conservation Project, an average of 27,000 tons per day of salt (as NaCl) was detected in the river basin upstream from Van Buren, Arkansas. It was determined that 53 percent was from natural brine pollution sources and the remaining from manmade and other sources.

The dissolved solids content varied (1959-65) from a mean of 896.7 mg/l, and a high of 2,340 mg/l at Fort Smith to a mean of 434.2 mg/l and a high of 1,212 mg/l at Pendleton Ferry. This was a gradual improvement of the river as it flowed through the basin and high quality water from tributaries diluted the contents of the Arkansas River. Although the quality of the water improved in the lower portion of the basin, the maximum limit of 500 mg/l set by the U.S. Public Health Service Drinking Water Standards was still exceeded.

The chloride content also improved during the passage of the river through the basin but did not fall below the maximum of 250 mg/l established by the U.S. Public Health Service Drinking Water Standards. The high at Fort Smith for chlorides was 1,200 mg/l with a mean of 294.5 mg/l (1959-65). The high at Pendleton Ferry was 485 mg/l with a mean of 132.9 mg/l.

Pollution of the Lower Arkansas River and its tributaries by 31 municipal, State, and Federal municipal and industrial waste discharges are causing oxygen depletion. These pollution problems are caused by overloaded or non-existent municipal treatment facilities. During low water flow conditions, septic conditions and fish kills occur in local stretches of the tributaries.

Navigation Use

The construction of a series of dams and impoundments to make the Arkansas River navigable from the mouth of the river upstream to Catoosa, Oklahoma will cause changes in flow regimen.

Impoundments cause changes in the river environment, thus a definite change will occur in the present biotic river communities, to one simulating a lake community. Because of reduction in stream velocities, siltation will take place and clarification of the impounded water will allow increased light penetration resulting in an increase in the primary productivity of the water, the extent depending on available nutrients content. This increased productivity, if in the form of undesirable aquatic plants, may cause taste and odor problems in water supplies. Channelization and continued dredging will cause a reduction in benthic organisms (fish food organisms), and will increase siltation in shallow lakes and bayous. Various conflicts of interest will occur; one example is that of commercial fishing vs. navigation.

The possibility of chemical and physical stratification of water within a reservoir may result in harmful effects to the aquatic life and aesthetic values downstream. The intermittent releases of water below the dam outfall can cause unnatural temperature fluctuations in the tail waters with resultant fish kills.

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